

## CLAIMS

What is claimed is:

1        1.    A vibration isolator which isolates a load  
2    that is separated from a floor, comprising:  
3        an active isolator assembly that provides active  
4    isolation of the load in a first direction; and,  
5        a passive isolator assembly that provides passive  
6    isolation of the load in a second direction.

1        2.    The vibration isolator of claim 1, wherein the  
2    first direction is parallel with a vertical axis and  
3    the second direction is parallel with a horizontal axis  
4    of the load.

1        3.    The vibration isolator of claim 1, wherein  
2    said passive isolator assembly includes a pendulum  
3    assembly.

1        4.    The vibration isolator of claim 3, wherein  
2    said pendulum assembly includes a cable that is coupled  
3    to the load.

1        5.    The vibration isolator of claim 4, wherein  
2    said passive isolator assembly includes a dashpot that  
3    is coupled to said pendulum assembly and the floor.

1           6.    The vibration isolator of claim 1, wherein  
2   said active isolator assembly includes an actuator that  
3   is coupled to the load and the floor.

1           7.    The vibration isolator of claim 6, wherein  
2   said active isolator assembly includes a sensor that  
3   senses a movement of a point between the load and the  
4   housing, and a controller which is coupled to said  
5   actuator and said sensor and which provides a drive  
6   signal to said actuator in response to a feedback  
7   signal from said sensor.

1           8.    The vibration isolator of claim 7, wherein  
2   said drive signal is a function of a transfer function  
3   and said transfer function is selectable from a  
4   plurality of different transfer functions.

1           9.    The vibration isolator of claim 7, wherein  
2   said sensor has a center axis that is coaxial with a  
3   center axis of said actuator.

1           10.   The vibration isolator of claim 1, further  
2   comprising a filter assembly that is coupled to said  
3   active isolator assembly and the load.

1        11. The vibration isolator of claim 10, wherein  
2        said filter assembly includes a profiled elastomer that  
3        is located within a profiled cavity of a coupler plate,  
4        so that a resonant frequency of said filter assembly is  
5        essentially constant for a predetermined range of loads  
6        applied to said filter assembly.

1        12. The vibration isolator of claim 11, wherein  
2        said profiled elastomer and profiled cavity each have a  
3        conical shape.

1        13. The vibration isolator of claim 1, further  
2        comprising a docking assembly that secures the load  
3        relative to the housing.

1        14. The vibration isolator of claim 13, wherein  
2        said docking assembly includes a pin that can be  
3        inserted into an aperture of a plate that supports the  
4        load.

1        15. The vibration isolator of claim 1, further  
2        comprising a foot that supports said active and passive  
3        isolator assemblies and which has a cleat that can be  
4        embedded into the floor surface.

1        16. A method for isolating a load from a floor,  
2 comprising:

3        a) actively isolating the load in a first  
4 direction; and,

5        b) passively isolating the load in a second  
6 direction.

1        17. A vibration isolator which isolates a load  
2 that is separated from a floor, comprising:

3        an actuator that is coupled to the load and the  
4 floor, said actuator having a center axis; and,

5        a sensor that is coupled to said actuator and the  
6 load, said sensor having a center axis that is coaxial  
7 with the center axis of said actuator.

1        18. The vibration isolator of claim 17, further  
2 comprising a controller which is coupled to said  
3 actuator and said sensor and which provides a drive  
4 signal to said actuator in response to a feedback  
5 signal from said sensor.

1        19. The vibration isolator of claim 18, wherein  
2 said drive signal is a function of a transfer function  
3 and said transfer function is selectable from a  
4 plurality of different transfer functions.

1        20. The vibration isolator of claim 17, further  
2 comprising a filter assembly that is coupled to said  
3 sensor and the load.

1        21. The vibration isolator of claim 20, wherein  
2 said filter assembly includes a profiled elastomer that  
3 is located within a profiled cavity of a coupler plate,  
4 so that a resonant frequency of said filter assembly is  
5 essentially constant for a predetermined range of loads  
6 applied to said filter assembly.

1        22. The vibration isolator of claim 21, wherein  
2 said profiled elastomer and profiled cavity each have a  
3 conical shape.

1        23. The vibration isolator of claim 17, further  
2 comprising a docking assembly that secures the load  
3 relative to the floor.

1        24. The vibration isolator of claim 23, wherein  
2 said docking assembly includes a pin that can be  
3 inserted into an aperture of a plate that supports the  
4 load.

1        25. A vibration isolator which isolates a load  
2 that is separated from a floor, comprising:

3        an active isolator assembly that provides active  
4        isolation of the load; and,  
5        a docking assembly that secures the load relative  
6        to the floor.

1        26. The vibration isolator of claim 25, wherein  
2        said docking assembly includes a pin that can be  
3        inserted into an aperture of a plate that supports the  
4        load.

1        27. The vibration isolator of claim 26, wherein  
2        said docking assembly includes a stepper motor which  
3        moves said pin into said aperture.

1        28. The vibration isolator of claim 26, wherein  
2        said active isolator assembly includes an actuator that  
3        is coupled to the load and the floor, a sensor that  
4        senses a movement of a point between the load and the  
5        floor, and a controller which is coupled to said  
6        actuator and said sensor and which provides a drive  
7        signal to said actuator in response to a feedback  
8        signal from said sensor.

1        29. The vibration isolator of claim 28, wherein  
2        said drive signal is a function of a transfer function  
3        and said transfer function is selectable from a  
4        plurality of different transfer functions.

1        30. The vibration isolator of claim 28, wherein  
2        said sensor has a center axis that is coaxial with a  
3        center axis of said actuator.

1        31. A method for isolating and securing a load to  
2        a floor, comprising:

3        a) actively isolating the load from the floor;  
4        and,

5        b) activating a pin which couples and secures the  
6        load to the floor.

1        32. The method as recited in claim 31, wherein the  
2        pin is inserted into an aperture of a plate that  
3        supports the load.

1        33. A vibration isolator which isolates a load  
2        that is separated from a floor, comprising:

3        an actuator that is coupled to the load and the  
4        floor;

5        a sensor that senses a movement of a point between  
6        the load and the floor; and

7        a controller which is coupled to said actuator and  
8        said sensor and which provides a drive signal to said  
9        actuator in response to a feedback signal from said  
10       sensor, said drive signal being a function of a

11 transfer function that is selectable from a plurality  
12 of different transfer functions.

1 34. The vibration isolator of claim 33, further  
2 comprising a passive isolator assembly that passively  
3 isolates the load.

1 35. The vibration isolator of claim 34, wherein  
2 said passive isolator assembly includes a pendulum  
3 assembly.

1 36. The vibration isolator of claim 35, wherein  
2 said pendulum assembly includes a cable that is coupled  
3 to the load.

1 37. The vibration isolator of claim 35, wherein  
2 said passive isolator assembly includes a dashpot that  
3 is coupled to said pendulum assembly and the floor.

1 38. The vibration isolator of claim 33, wherein  
2 said sensor has a center axis that is coaxial with a  
3 center axis of said actuator.

1 39. The vibration isolator of claim 33, further  
2 comprising a damper assembly that is coupled to said  
3 sensor and the load.



1        40. The vibration isolator of claim 39, wherein  
2        said filter assembly includes a profiled elastomer that  
3        is located within a profiled cavity of a coupler plate,  
4        so that a resonant frequency of said filter assembly is  
5        essentially constant for a predetermined range of loads  
6        applied to said filter assembly.

1        41. The vibration isolator of claim 40, wherein  
2        said profiled elastomer and profiled cavity each have a  
3        conical shape.

1        42. The vibration isolator of claim 33, further  
2        comprising a docking assembly that secures the load  
3        relative to the floor.

1        43. The vibration isolator of claim 42, wherein  
2        said docking assembly includes a pin that can be  
3        inserted into an aperture of a plate that supports the  
4        load.

1        44. The vibration isolator of claim 39, further  
2        comprising a foot that supports said actuator and said  
3        sensor and which has a cleat that can be embedded into  
4        the floor.

1        45. A method for isolating a load from a floor,  
2 comprising:  
3        a) selecting a transfer function from a plurality  
4 of different transfer functions;  
5        b) sensing a motion between the load and an  
6 inertial reference; and  
7        c) driving an actuator with a drive signal that  
8 is a function of the selected transfer function.

1        46. The method of claim 45, wherein the transfer  
2 function is selected by storing the transfer function  
3 in a memory device.

1        47. A foot for a vibration isolator that isolates  
2 a load from a floor, comprising:  
3        a plate; and,  
4        a cleat that extends from said plate and can be  
5 embedded into the floor.

1        41. A vibration isolator which isolates a load  
2 that is separated from a floor, comprising:  
3        an active isolator assembly that provides active  
4 isolation of the load; and,  
5        a plate that is coupled to said active isolator  
6 assembly; and,

7        a cleat that extends from said plate and can be  
8 embedded into the floor.

1        49. The vibration isolator of claim 48, further  
2 comprising a passive isolator assembly that provides  
3 passive isolation of the load.